

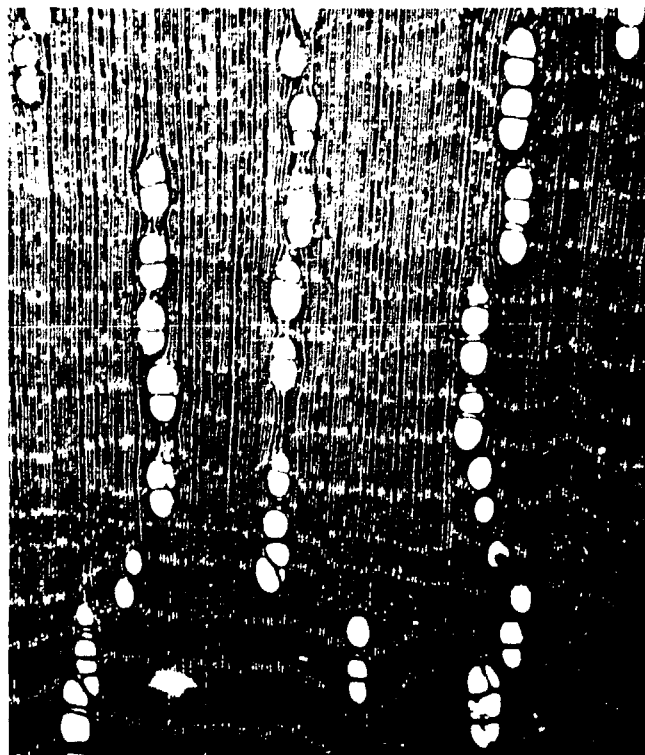
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WOOD ANATOMY  
OF THE  
NEOTROPICAL SAPOTACEAE  
XXVII. SARCAULUS

RESEARCH PAPER FPL 398

FOREST PRODUCTS LABORATORY  
FOREST SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
MADISON, WIS.

MAY 1981



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## Abstract

This study is based on wood specimens of Sarcaulus brasiliensis (A.DC.) Eyma which was, for a long time, the sole representative of the genus. A second species, S. wurdackii Aubr., was described in 1965 from Peru. Wood of the latter species was not available for study. The genus is anatomically well-defined and, although the topography is rather similar to some species of Ecclinusa and Ragala, it can be readily separated by several anatomical features.

## Preface

The Sapotaceae form an important part of the ecosystem in the neotropics; for example, limited inventories made in the Amazon Basin indicate that this family makes up about 25 percent of the standing timber volume there. This would represent an astronomical volume of timber but at present only a very small fraction is being utilized. Obviously, better information would help utilization--especially if that information can result in clear identification of species.

The Sapotaceae represent a well-marked and natural family but the homogeneous nature of their floral characters makes generic identification extremely difficult. This in turn is responsible for the extensive synonymy. Unfortunately, species continue to be named on the basis of flowering or fruiting material alone and this continues to add to the already confused state of affairs.

This paper on Sarcaulus is the twenty-seventh in a series describing the anatomy of the secondary xylem of the neotropical Sapotaceae. The earlier papers, all by the same author and under the same general heading, include:

- |  |                                       |
|--|---------------------------------------|
| I. Bumelia--Res. Pap. FPL 325          | XIV. Elaeoluma--Res. Pap. FPL 358     |
| II. Mastichodendron--Res. Pap. FPL 326 | XV. Sandwithiodoxa--Res. Pap. FPL 359 |
| III. Dipholis--Res. Pap. FPL 327       | XVI. Paralabatia--Res. Pap. FPL 360   |
| IV. Achrouteria--Res. Pap. FPL 328     | XVII. Gambeya--Res. Pap. FPL 361      |
| V. Calocarpum--Res. Pap. FPL 329       | XVIII. Gomphiluma--Res. Pap. FPL 362  |
| VI. Chloroluma--Res. Pap. FPL 330      | XIX. Chromolucuma--Res. Pap. FPL 363  |
| VII. Chrysophyllum--Res. Pap. FPL 331  | XX. Manilkara--Res. Pap. FPL 371      |
| VIII. Diploon--Res. Pap. FPL 349       | XXI. Barylucuma--Res. Pap. FPL 372    |
| IX. Pseudoxythece--Res. Pap. FPL 350   | XXII. Pradosia--Res. Pap. FPL 373     |
| X. Micropholis--Res. Pap. FPL 351      | XXIII. Gayella--Res. Pap. FPL 374     |
| XI. Priourella--Res. Pap. FPL 352      | XXIV. Ecclinusa--Res. Pap. FPL 395    |
| XII. Neoxythece--Res. Pap. FPL 353     | XXV. Ragala--Res. Pap. FPL 396        |
| XIII. Podoluma--Res. Pap. FPL 354      | XXVI. Myrtiluma--Res. Pap. FPL 397    |

Publication in this manner will afford interested anatomists and taxonomists the time to make known their opinions and all such information is hereby solicited. At the termination of this series the data will be assembled into a comprehensive unit.

# WOOD ANATOMY OF THE NEOTROPICAL SAPOTACEAE

## XXVII. SARCAULUS

By

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### Introduction

The genus Sarcaulus was first described by Radlkofer in 1882 based on Chrysophyllum macrophyllum Martius. Separation from Chrysophyllum was made on the basis of the thick, fleshy, globose corolla of Sarcaulus which is said to be unique among the Sapotaceae. According to Eyma (4)<sup>3/</sup> the specific name macrophyllum which had been adopted by Radlkofer had to be discarded because of several older homonyms. Therefore, he created the new combination Sarcaulus brasiliensis (A.DC.) Eyma. This genus has been universally accepted by all students of the family including the most recent, Aubréville (1) and Baehni (2). Flora of Peru (3) cites a second species, Sarcaulus wurdackii Aubr. apparently endemic to Amazonian Peru (Loreto).

The best known species, Sarcaulus brasiliensis, ranges from Surinam and French Guiana into the Amazon Basin of Brazil and Peru with an eastward extension into Bahia and Pernambuco.

### Description

Based on 14 specimens of Sarcaulus brasiliensis (A.DC.) Eyma from Brazil and Surinam. Wood of S. wurdackii Aubr. was not available for this study.

General: Wood pale brown to pinkish brown with little or no luster. No distinction in color between heartwood and sapwood. The narrow growth rings present are defined by a very narrow zone of flattened wood fibers. The wood is at the lower end of the specific gravity spectrum for the American Sapotaceae, with an average of 0.63; the family average is approximately 0.87.

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<sup>2/</sup> Maintained at Madison, Wis. in cooperation with the University of Wisconsin.

<sup>3/</sup> Underlined numbers in parentheses refer to literature cited at the end of this report.

Anatomical:

The pores are generally arranged in spaced radial files similar to Ragala and some species of Ecclinusa. Solitary pores are present but more commonly occur in radial multiples of 2-4 and occasionally to 6 (fig. 1). Maximum tangential pore diameter of individual specimens ranged from 95  $\mu\text{m}$  to 158  $\mu\text{m}$  with an average of 138  $\mu\text{m}$ .

Vessel member length averages of the individual specimens range from 670  $\mu\text{m}$  in a juvenile specimen (Schunke 4415) to 1,010  $\mu\text{m}$  with a generic average of 835  $\mu\text{m}$ . Intervessel pit diameter 6-8  $\mu\text{m}$ . Tyloses when present, thin-walled. Perforations simple.

Axial parenchyma typically banded; the individual bands irregularly 1-2 seriate (fig. 2). The individual cells with or more commonly without brown contents. Small silica particles infrequently present and then only in the cells with other contents.

Wood rays essentially uniseriate (fig. 3) with an occasional ray showing one or two paired cells; heterocellular. Silica abundant and in mature wood limited to those cells with other contents; ranging in maximum size of 20-30  $\mu\text{m}$ . The silica particles are largest and most conspicuous in the tabular cells; smaller and less frequent in the square or upright marginals (fig. 4). Vessel-ray pitting irregular in shape and size but most commonly linear. Lateral walls of erect marginals finely pitted and smooth in appearance.

Wood fibers with moderately thick walls. Fiber length averages of the individual specimens ranging from 1.17 mm to 1.63 mm with an overall average of 1.37 mm. Vascular tracheids sparse in macerated material and usually difficult to find in prepared slides.

Silica content relatively high, ranging from 0.82 to 2.74 percent of the weight of the oven-dry wood. Average silica content of the specimens chemically analyzed was 1.40 percent.

Diagnostic features: Wood light brown or pinkish brown; relatively light in weight for a Sapotaceae. Pores in spaced radial files. Silica abundant in the ray cells and conspicuous in the tabular cells. Lateral walls of upright marginal cells of wood rays finely pitted and appearing smooth. Could be confused with the Ecclinusa species with uniseriate rays but here the lateral walls of the upright ray cells are conspicuously pitted and the silica particles are not conspicuously arranged in tiers.

Acknowledgment: The author is particularly grateful for the assistance of Dr. Arthur Cronquist and Dr. A.M.W. Mennaga for their examination of certain and critical herbarium specimens, and to Dr. J. M. Pires for providing special collections of Sarcaulus for this study.

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No. 3; p. 173-177.
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Wood anatomy of the neotropical Sapotaceae: XXVII.  
Sarcaulus, by B. F. Kukachka, FPL.  
6 p. (USDA For. Serv. Res. Pap. FPL 398).

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Table 1.--Sarcaulus: Specimens investigated and selected parameters<sup>1/</sup>

| Collector and number     | Sp. gr. | VML   | MPD | FL   | Si <sup>2/</sup> | Source  | Wood collection<br>No. <sup>3/</sup> |
|--------------------------|---------|-------|-----|------|------------------|---------|--------------------------------------|
|                          |         |       |     |      |                  |         |                                      |
| Krukoff 6179             | 0.62    | 860   | 158 | 1.46 | 2.74             | Brazil  | MAD 12338                            |
| Lindeman 4681            | 4/ --   | 1,010 | 110 | 1.53 | 1.19             | Surinam | U 3223                               |
| Lindeman 5619            | --      | 770   | 95  | 1.30 | 1.26             | Surinam | U 3884                               |
| Lindeman 6336            | 0.63    | 900   | 126 | 1.39 | 0.82             | Surinam | MAD 32938                            |
| Maguire et al. 51839     | 0.64    | 960   | 158 | 1.63 | 0.91             | Brazil  | MAD 21530                            |
| Oldenberger et al. 1290  | --      | 900   | 118 | 1.47 | 1.01             | Surinam | U 17958                              |
| Pires 17000              | --      | 780   | 150 | 1.31 | --               | Brazil  |                                      |
| Pires 17001              | --      | 810   | 142 | 1.33 | 0.93             | Brazil  |                                      |
| Pires 17002              | --      | 820   | 158 | 1.39 | --               | Brazil  |                                      |
| Pires 17003              | --      | 770   | 158 | 1.28 | 1.01             | Brazil  |                                      |
| Prance 13689             | 0.67    | 820   | 150 | 1.28 | 2.52             | Brazil  | BWC 28546                            |
| Schunke 4415             | 0.60    | 670   | 134 | 1.17 | --               | Brazil  | MAD 34725                            |
| Silva, M.G. 551          | --      | 760   | 142 | 1.26 | --               | Brazil  | MG 551                               |
| Silva and J. Jangoux 104 | 0.65    | 860   | 142 | 1.46 | 1.65             | Brazil  |                                      |
| Average                  | 0.63    | 835   | 138 | 1.37 | 1.40             |         |                                      |

1/ Sp. gr. = specific gravity; VML = vessel member length; MPD = maximum pore diameter; FL = fiber length; Si = silica.

2/ Silica content based on oven-dry weight of wood and determined by Martin F. Wesolowski, Chemist, FPL.

3/ BWC = H. P. Brown wood collection (Syracuse); MAD = Forest Products Laboratory, Madison, Wis.;

MG = Museu Goeldi (Belem); and U = Utrecht.

4/ Dashes indicate undetermined values; blank spaces indicate unassigned wood numbers.

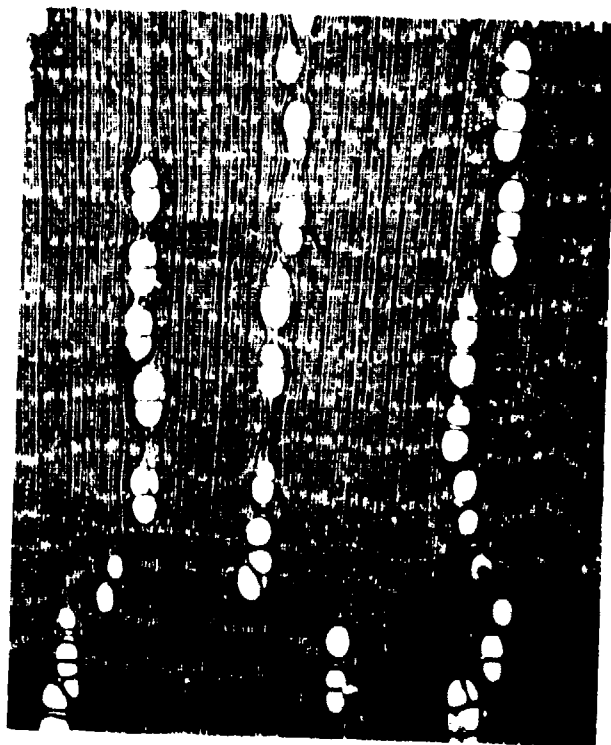


Figure 1.--*Sarcaulus brasiliensis*, typical pore and parenchyma arrangement X 30. (Maguire et al. 51839).

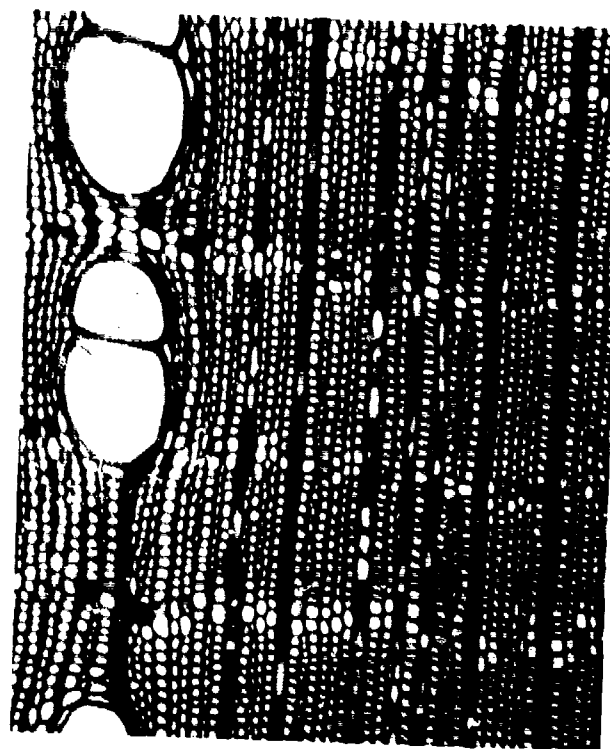


Figure 2.--Same as figure 1, parenchyma detail at 110 X.



Figure 3.--Same as figure 1, uniseriate wood rays at 110 X.



Figure 4.--*S. brasiliensis*, silica in tiers of procumbent cells, 110 X (Schunke 4415).